

# PATHWAYS

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## THE PARADIGM SHIFT

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**THE FUTURE SCHOOL-STRATEGIES IN THE CLASSROOM**, Source-books for the pre-primary teachers, published by the **Educational Planning Group**, (about which the Pathways have shared in the April issue), is finally available for the schools and teachers! This is a set of **THREE** modules, namely,

- Module I - Exploring the Rationale,*
- Module II - Exploring the Curriculum*
- Module III - Exploring some strategies and techniques.*

Using these materials, **Mr. Jose Paul, and I**, along with the two pre-school teachers, **Ms Anjali Arora, and Ms. Veena Kashyap**, from the **Sardar Patel Vidyalaya**, New Delhi, conducted a five-day workshop for the Pre-primary Teachers, of the Air Force Unit Schools of Western Command, at the WAC Nursery School, Subroto Park, New Delhi, from **17.6.1995 to 21.6.1995**.

It was indeed an exhilarating experience for each one of us to have a forum with a group of 40, highly motivated teachers, who were willing to look for changes and modifications towards their teaching approaches and attitudinal perspectives with the pre-primary children. Some very interesting revelations turned out during the sessions.

On the entire first day and the first half of the second day, there was an openness exhibited by the group to explore the possibilities of perceiving a different approach towards teaching and learning, viz, **retaining and enhancing the joy and enthusiasm in both the children and the teachers, in the class rooms**. Yet, this was expressed by them with a "but", that is to say, *"We do understand well this need for children, and*

*even the necessity to do so, but, how are we going to complete the syllabus?"*

**"Completing the prescribed syllabus"** (which surprisingly varied with the various sectors - may be the city-based pre-schools would have 11 text-books prescribed for children, while their rural/interior counterparts would have 5/6.....), in their respective schools was a prime, and, needless to say, a genuine concern with these teachers!

This concern apparently took a back-seat, as the teachers received hands-on experiences with activities in the work-shop - to name a few, clay work, maths, language and a class situation created with our teachers taking Maths and Language sessions for a group of 30 four and a half year olds, a thematic/integrated approach towards the "existing" syllabus which the teachers themselves worked out, etc. All of these enabled the group to widen their horizons and most important was that they experienced the power they had in the classrooms to either mar or make the child! Several teachers on the last day, stated *"We may have as many set of prescribed topics, texts and syllabi given by our respective schools, yet we are sure we can handle these in a different style, keeping alive the joy and enthusiasm not only for children but also for us!"*

We reached our objective of enabling teachers to revive their interest, by taking-off from their respective status quo, within the existing resources (human and physical) available to them! They were also led to see that the syllabus of the school, is to serve as a means to make learning-teaching contextual and life-related rather than only content-based!

This is the shift of focus that we are in dire need of in our class rooms today!



# "MOVING" EDUCATION

PART - III

How can we make use of the idea of movement experiences to introduce/teach/reinforce scientific concepts ?

Below are a set of possible questions/situations, related to 'science' that could be strategically created in the classrooms to promote a scientific attitude, and to teach scientific concepts clearly and experientially.

## (C) SCIENCE

### (i) Sensory Experiences.

1. I shall show you a picture. What you have to do is to look at that picture and react to what you see through movement. In what directions do you feel like going ? Does the picture give you any feelings of speed and force. Try and answer these through movement. (A variety of pictures could be used to evoke various responses).

2. Toss a rubber from hand-to-hand, focussing on the rubber only all the time not taking your eyes off it. Next, focus on your left hand only as you toss the rubber. After several such tosses, focus on your right hand only.

Gradually, instruct them to focus on the ceiling, on the floor, on the right wall, on a friend, etc. Then they may be asked to close their eyes and try tossing and catching the rubber.

When was it easiest to catch the rubber ? When was it the most difficult ? (Such experiences help us to remember to always focus on the object we are trying to catch).

3. Can you be someones' shadow ? Find a partner and stand behind him or her. Your partner will be your leader. Follow your partners' movements exactly, focussing on your partner at all times. The leader has the freedom to think of many interesting shapes and movements as you move through space. As you see my signal, change leaders.

4. I shall play various sounds. You will listen to what you hear and respond to those sounds through movement, even if you do not recognise the sound. Just listen and move the way the sound makes you feel like moving. (The teacher here has many pos-

sibilities to use sound effects, mechanical sounds, animal and human sounds).

5. Show me what would you do if you heard an ambulance ? Similarly show me what would you do if you heard crying, talking, swinging, whispering, honking, cheering, snoring, sneezing, coughing, whistling, etc.

6. Show me through movement how the taste of food makes you feel ? (Here the children are allowed to taste all kinds of food).

7. Quickly form two equal lines facing each other, keeping a distance of about 8 feet between. I shall stand behind one line and show a food picture for the opposite line to see. That line (facing the picture) shall make movements using the whole body, that express their reactions to tasting the food in the picture. The other line will have to guess what the food is by watching the gestures, movements and expressions. Then we shall switch roles.

8. Show me through movement, what do you do when you smell smoke ? Similarly, when you smell fresh flowers, garbage, peppermint, oil, petrol, etc.

9. Let us all create a smell dance ? Each one of us should think of something to smell, and express our reactions to that smell through movement. When one is performing, the others have to guess the smell each group is describing.

10. Every child is asked to bring small objects put in a bag to the class. The bags would be shuffled and every child would be asked to pick up a bag, without looking inside. At each turn, one child will put his hand in his bag, feel the object, and describe through movement the texture, size, weight and shape of the object, while the rest of the class will guess what is in the bag. If the denner does not know what is in the bag he may look in to see.

11. Get a partner, and stand back-to-back just touching one another. Can you slide across the room and still stay together by using your sense of touch ? Then try to slide with different speeds.

### (ii) Animals.

12. Show some animals through movement that move



low to the ground.

Can you now make the shape and movements of an animal that is tall or one that moves in the sky.

Now make the shape of an animal that neither moves low to the ground nor high in the sky.

Lets' try showing the different levels of animals that can move on more than one level. For e.g. Insects can also crawl up and birds can also move on the ground.

13. Try showing an elephant that can move a giant tree trunk. Show me the shape and movements of a weak animal. Now describe through movement, the cause for this animals' weakness.

14. Form groups of 6 each quickly. We shall now create a zoo. One group must make the shape, movements and characteristics of the animals, the other of the reptiles, the third of the amphibians, the fourth of an aquarium, the last of an aviary. When all the groups are ready. We shall guess movements of all the groups and the class they belong to.

15. Lets' look at the list of the names for groups of animals - a flock of sheep, a colony of ants, a swarm of bees, a murder of crows, a gam of whales, a troop of kangaroos, a school of fish, a parliament of owls, a string of ponies.

Now, get together to move as each of these.

16. Which animals are trained to perform ? Now we shall create a circus. Each one will think of such an animal and show your friends your animal and its tricks through movement. The class will guess. After everyone finishes their turn, we shall discuss what we saw.

### (iii) Plants.

17. I shall show you a list of plants we eats. If you know which are roots, stems, bulbs, or leaves, make the appropriate letter. For e.g. If the plant is a root, make an R, if it is a bulb, make a B, and so on.

18. What do plants need to grow ? - Air, water, soil and sunlight.

How would you show me air through movement ? In what directions does air travel ? In what speed with what force ? Show me through movements where air travels in various directions, speed and force. Show me air on a very hot day, on a cool day and on a windy day.

Show me the various ways plants get water; For e.g. hose, rain, river, sea, sprinkler, etc.

Show me different kinds of soil. How would

frozen soil look like; similarly muddy soil, rocky soil, sandy soil ? Can you show me how the sun shines on plants?

19. Let us go through the things that plants give us - food, cloth, medicine, wood, etc. Now, through movement describe one item from the list that would fit under each heading in the list. For e.g. saree, bread, rice, table, etc. Here, try to move in and through space, instead of just freezing in a shape. We will guess and write the items shown under the correct headings, on the board.

### (iv) Seasons & Weather.

20. We shall think about the seasons and our five senses. Show me through movement some of the smells of the summer season, winter, spring and rain. Think of some of the first signs of a new season. Show through movement, while the rest will guess the season and the signs.

21. Let us think of how plants change with the seasons. Think of a flower/vegetable/fruit/tree. Show through movement what happens to it in spring, in summer when they get too much sun, during the rains, and during winter.

22. Through step-by-step movement, show the formation of clouds. (Pick up any one place from where water comes.

23. Weather affects our mood in various ways - show me through movement, how do you feel on a hot and humid day ? Similarly on a cold, windy day. Make use of various levels and speed as you move.

24. Some people create rain dances when they want rains. Lets' here create one to bring on, say sun, fog, etc. Each one of us can choose the weather we want, and create a dance. The others will guess what each person is dancing about.

### (v) Our body.

25. Lets' take our pulse and tap out the rhythm with our foot. Perform one movement for each heartbeat. Lets' now speed up our heartbeat by jogging. Now find the rhythm and move through space at that speed, by jumping, leaping, hopping, etc. Take rest. Breathe slowly and let the heartbeat slow down. Listen to the slow rhythm and move slowly.

26. Pretend you are a balloon. Fill your lungs with air. Make a huge balloon shape with your body. Float like the balloon all over. Suppose there is a big hole



in your balloon what would happen? - Air will rush out deflating quickly. So to avoid this, seal your balloon, fill up with air again and continue floating. Now you have a leak in your balloon. What would happen to it? Air would leak slowly, causing slow deflating. Change your movement with each break. Here we can learn that we can let the air out of our lungs in a big breath or slowly, i.e., we can control our breathing.

27. The place where two bones can move against each other is a joint. Try moving at your elbow joint as many ways you can. Similarly try at your wrist joint, shoulder joint, neck joint, ankle, hip, waist, fingers, and toes.
28. Work in pairs one will be the skeleton, and the other the muscle. The skeleton will rattle its bones in as many ways he can, while the muscles moves strong. We will guess who is the skeleton and who is the muscle.
29. Try using your arms, leg, head and back as a sword - slash it all about without touching anyone.
30. Pretend that the room is dark except for some light on your waist. Move your waist in as many ways as possible. Then try moving other body parts, keeping your waist as the center of attention. Similarly try with you shoulder, knee, finger, back, and head being the center of attention.

#### (vi) Machines.

31. Make your arms as scissors, and move them to cut a big piece of paper. Then try using your legs, one arm, one leg. Try cutting the paper on a low level with your arms, on a high level with your legs?
32. Think of a machine and make your own sounds for that we shall guess what your machines is from your actions and sounds.
33. Form groups of six each. Each group will create one big machine. Can each member in the group be a simple machine that is a part of the bigger machines, i.e., the levers, wheels, motors, pulleys, etc. must be seen.
34. Invent a machine that no one has invented before. Think of a name for it. Show us the machine through movement through movement and we will guess what it does.
35. Show me through actions, how people first washed clothes; (hitting and rubbing against rocks) what came next (stone), what came later (simple washing

machine), and later (modern washing machine).

#### (vii) Sun, Moon, Stars and Planets.

36. Show me through movement, the following :-

- \* how the earth moves;
- \* shape of the earth and turn as the earth turn;
- \* turn your body around in a circle and move through space as the earth;
- \* keep turning your body and move through space in a big curved pathway (as the earth moves in a curved pathway).

37. How many moons does the earth have? Make the shape of a full moon. Show through movement how and where the moon moves. The children can be asked, which was easier - to be the earth or the moon. (Moon only moves around itself once for each circle around the earth). Let us now add the sun. Lets' try to see if the earth can move around the sun, while the moon is moving around the earth.

38. Show me through movement. What the planets. Mercury, Venus, Mars, Jupiter, are like, their temperature, surface, size and shape.

39. Demonstrate a lunar eclipse and a solar through movement.

#### (viii) Electricity.

40. Show me through movement :
  - : where electricity comes from? (Generators from power plants)
  - : what makes these generators run? (Water, coal)
  - : how water can be used to run a generator?
  - : what happens to the coal to help run a generator?
  - : other things besides generators that produce electricity (battery, atomic reactors, etc.)
41. Form groups quickly. Each group will demonstrate how an electric switch works. The members in each group will have to make a dry cell, wires, light bulb, switch holder, switch and a metal strip). One member will be the switch operator.
42. Each group will demonstrate how the school bell works. Each group will show how they solved this problem.
43. Each group will get a card written one of the following :- home, office, shop, factory, studio, hospital, AIR, etc. Every group will think of one/more object(s) in that place that are run by electricity.



Show us through actions and movement, we will guess the object(s) and the place in which the object(s) are found.

#### (ix) Magnets.

44. Pretend that all of you are magnets that have only south poles. Move around the room, showing what happens when you get near another person. Move on various levels, in various directions and varying speeds.

Now decide whether you want to be the north pole or a south pole. If you have opted to be a north pole, point your fingers upward, if south pole, point your fingers downward. Now show me movements in different and interesting ways what happens as you get near other magnets.

45. Make the shape of an object that can be picked up by a magnet. Pretend you are being moved around the room by a huge electromagnet. I shall click. Listen to it, and as the click gets slower, the electricity must get less powerful.

Show through movement, how your object loses magnetism becoming weaker and weaker until they lie on the ground.

These kinds of problem - situations cited need a specific attitude and hence a different teaching strategy. Needless to say, such a technique involves tremendous planning and organisation skills, to gain optimum result.

Undoubtedly this is a diversion from the traditional teaching - learning mode. This is an approach that has a direct access to all-round growth and development.

We hope that some of these would pave avenues and possibilities in your classroom for relating joy and enthusiasm in the teaching - learning process.

In the next issue, we shall explore movement experiences with **Social Studies** situations and conclude the explosions associated with "**embodying**" experiences!

## DOES THE SUN REALLY RISE IN THE EAST AND SET IN THE WEST?

Seeking for the truth of the life we live and experience is an unique gift endowed on the species, referred to as the Homo-sapiens. This is strikingly manifested by our children when they ask innumerable questions about **everything** that they see and experience. Some of the common curiosities they want to be satiated about is about the sun, moon, stars, oceans, lakes, mountains, and our earth!

### How do we go about finding the truth?

By sitting around and guessing?? Oh! That's lazying.....By wishing or hoping??? Oh! that could be silly and crazy!! Surely, there is a way-----by looking around, listening and thinking about what we see and hear!

Science is really the means through which we can know the secrets of the truth about the world we live in!

Let us think here about **why we have day some time and night some time.**

For this we should first know about our **earth**

on which we live. The earth is a big, round ball that moves about in space. This ball moves not by rolling but by **spinning** itself.

If you want to see this, take an orange, and push a pencil right through the middle of it, in such a way that you can hold on to the pencil ends and spin it round and round (**fig. a**). In other words, **we** are spinning all the time! (If oranges are not in season, you could try it with a ball of clay). But this ball of earth is not spinning straight up, like in **fig. a**, but it is always leaning over slightly, like in **fig. b**.



fig. a

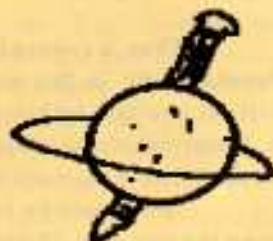


fig. b

.....contd. on page 10..



# CONCEPT LEARNING - INTEGRAL PART OF LIFE ?

## PART - I

Perspectives in the history of education have taken shifts, twists and turns, with the varying needs and importance attached by the society of a particular era. Yet, attainment and development of concepts have remained the most important goals of education. So, all educationists, whatever their target audience, focus their attention on actually **teaching concepts**.

Strangely, despite this constancy and struggle to help students learn concepts, all efforts attempted in this are so mechanical a style that we have reached a mental bankruptcy in searching for new strategies to make the teaching-learning process of concepts tactful, effective, and ever-lasting. The new/different strategy should eventually help the learners to not only use this process but also evaluate their use of this process.

Hence, we initiated to begin the search for making the process of **attainment and development of concepts** not only methodical but also equip the students to learn the tactics for learning concepts independently.

**A concept is a word to describe our thoughts**, which is nothing but a set of mental pictures, sensations, emotions and linguistic information, phonetics, sounds, and so on. For e.g. "**red**" is the word we use to describe our mental imagery and sensations about a certain type of colour. When a child learns that the word "**red**" is a certain type of colour, he/she has **attained the concept**. When the child learns that there are many kinds of red (dark red, light red, blood red, orange red, etc.), he/she is **refining or developing his concept of "red"**.

Similarly, a "**dog**" is the word we use to describe our mental imagery and sensation about a certain type of 4-legged animal. When we learn that the word "**dog**" is a certain kind of animal, we have **attained the concept**. When we learn that there are many kinds of dogs (Doberman, Bull-dogs, Pomeranian, etc.), we are **refining or developing our concept** of a "**dog**".

**Thus, a concept is, to begin with, vocabulary development.** In this sense a concept can be attained without having a technical or detailed understanding of it. Nevertheless, in some cases it is necessary to know a concept in a rigorous manner, as in science.

This would be followed by the tactic of identifying the category, identifying examples and attributes and attempting to define the concept attained, thereby, exploring and discovering similar and dissimilar concepts - **Concept development**.

In a school setting, most of the time, both concept attainment and development are taught as vocabulary development.

Here, we have split the teaching-learning of concepts in two parts, viz.

- (a) **Concept Attainment, and**
- (b) **Concept Development.**

(a) For **Concept Attainment**, it is essential to consider in detail about vocabulary development.

Working on the enhancement and increase in vocabulary would mean, development of any one of the following types of vocabulary :

- a. **Listening vocabulary** : These words are what the children understand when heard in a speech or conversation. This is essentially same as ones' knowledge of a concept. For e.g., Hearing the word "**dog**" and associating it with images and sensations of a particular type of 4-legged animal, means the child has this word in his listening vocabulary.
- b. **Speaking vocabulary** : These words are what the children are able to use in a speech or conversation. Obviously, the word must be in the listening vocabulary before one can use it.
- c. **Reading vocabulary** : These words are what children are able to recognise/identify immediately while reading.
- d. **Writing vocabulary** : These words are what children are able to use while writing, i.e., they can spell. Both the reading and writing vocabulary involves recognising the letter code; in other words, identifying the spelling correctly. This process of recognizing a word (reading) and spelling it correctly (writing) add one more dimension to the nature of a thought.

Thus a concept can be taught and attained by using the model in *Fig. 1*. In other words, in young children, the information about the concept through language, physical sensations and feelings, sound, and mental pictures, constitute to make a thought, thereby, contributing and accentuating the learning of concepts (a). This simply implies and reinforces the truth that there is no substitute to concrete, first-hand experiences! When children begin to recognise the words and the graphical representation of these words,



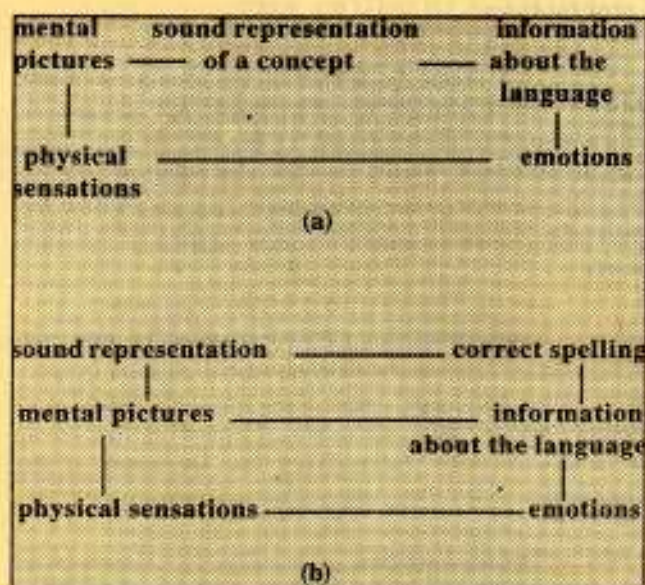


Fig.1

this constitutes one more dimension to the nature of the thought, thus making a dent in the learning of concepts.

In this sense, a concept can be taught as follows:

1. Provide a concrete or pictorial first hand experience, say a nature-walk, or some activity, like story, music, art, conversation, etc. For e.g. Trees.
2. Once they have experienced it, the teacher encourages them to describe/talk on the new concept from their experiences. The teacher enhances this verbal brainstorming by questioning, sharing, etc., in a number of situations, events and activities. This way the formation of a strong mental image of the concept is reinforced. Moreover, this gives them a lot of opportunities to hear and use the word a number of times.
3. While step 2 is going on, the teacher writes the word in print on a coloured chart paper - big, bold and clear, and points to the word all the time. This way the image of the 'word pattern' is imprinted in their minds' eye. For e.g. tree. Also, the spelling of the word becomes clearer.

As mentioned earlier, in scientific areas, it is necessary to know a concept in a detailed manner. In such cases it is not simply vocabulary development.

A detailed knowledge of a concept would include the following :-

- \* the category to which the concept belongs;

- \* examples of the concept;
- \* similar and dissimilar concepts;
- \* attributes of the concept, and, finally,
- \* the definition of the concept.

In schools, generally, teachers do not go into so much details, for, it is assumed that a student, during the course of time, will fill in some of these details about a concept, if he has repeated exposure to the concept. In other words, if a student encounters a word a number of times, he automatically, will identify similar and dissimilar concept, more examples and attributes of the concept, and so on.

Yet, it would be interesting to note that the teaching - learning process of the development of concepts can be made more effective, meaningful and motivating, if the components of a well developed concept are directly taught and reinforced what is meant by this is that, the students can be asked to :

- a. identify the class or category to which the concept belongs;
- b. identify examples of the concept;
- c. identify concepts similar to it, and state how they are similar;
- d. identify concepts dissimilar to it, and state how they are dissimilar;
- e. identify the attributes of the concept (intention being to find out those characteristics/attributes that seem important to the concepts and make it different from the others. For e.g., the specific attribute of an **object concept**, say ants, is their number or quantity; similarly the **action concept**, cooking, has a specific attribute in terms of something getting produced as a result of an action; school is an **event concept** that has the main attribute as one having a specific duration;);
- f. define (not describe) the concept.

Realization of all these steps may not apply for all concepts. Similarly, some concepts may have no examples, some may be difficult to classify or categorise, etc.

It would be inappropriate to go through the above-mentioned concept attainment and development processes for all the concepts in the curriculum, for, we would be virtually spending our academic year doing only this! Most of the concepts are learned (attained and even developed) through incidental exposure. That is to say, many of the concepts students learn through wide reading and listening, by repeatedly hearing and encountering them in the classrooms and sometimes outside them.



Therefore, only those concepts that are not picked up this way, and those that require to be taught at the development level, like those associated with physics, chemistry and biology, economics, etc., should be selected.

For those that they are expected to know within a given content area or a particular level of maturity, they should be led from the known to the unknown.

Let us take a look at a sample strategy for teaching the concept, "elements" and "compounds".

This concept could perhaps be best introduced by saying that it was believed that all substances that we come across are made up of simpler/elementary substances. For e.g. any food item, say pizza, ice-cream, etc. Ice-cream is a constitution of the simpler substances, like, milk, sugar, and flavor. The students could be allowed to find out the elementary substances of the food items they eat, and other items they are familiar with, like paper, cloth, wood, etc. (identifying the examples)

The next class could be a discussion of those items that could not be broken into any other substances. How do we break up things, - by heat, by passing electric current? The teacher and the students together explore the possibilities of breaking up substances like water and chemicals and see what happens to it. Here, the substances are categorised/classified as those can be broken up further and those cannot be

broken down.

This could be followed by observing water,  $H_2O$ . Water is made up of hydrogen and oxygen. So when water is electrolysed, it breaks up into these simple elements. Similarly, they are asked to find out what happens to other substances like sulphides, oxides and chlorides (identifying examples of the concept).

They would be invited to observe that elements that release at the cathode are all similar (exception being hydrogen), and they were all metallic in nature. While those elements released at the anode were non-metallic (identifying the attributes of the concept).

Having done this, a possible conclusion could be drawn out, by stating that only those substances that could not be broken up into any other substance should be considered an element. Those substances that break up are compounds (defining the concept).

Another example is of the teaching of **Photosynthesis**.

When students exhibit an understanding of this concept at the attainment level, it could be developed by comparing the needs of a plant with the similar needs of all living things, like, food, water, warmth and air. They could be then asked how a plant and a person *are not similar*.

## A problem solving session in Geometry - A sample of giving the old wine in a new bottle!.

**Main Objective:** *The students would be able to discover the property of a parallelogram, and thereby, define the same.*

**Methodology:** The class would be instructed to make groups of 5. The teacher will not announce the objective. She would simply provide them with a variety of cut-outs of different quadrilaterals (fig. a). Two loops (fig. b) on the floor to represent **Set A and Set B** respectively, would be drawn on the floor for each groups. Set A would be for those cut-outs which represent the quadrilaterals and Set B for those that do not. The groups would be asked to classify the given cut-outs in two sets. Since the teacher's objective is set to see all the parallelograms in Set A, she will observe what figures the children have taken and placed. If the children have placed a parallelogram in set A, the teacher would say "yes". If it is not a parallelogram, she would say "no". The children would select another figure and decide to put it in one of the sets. The teacher's responses would continue till all the cut-outs are placed in the respective sets.

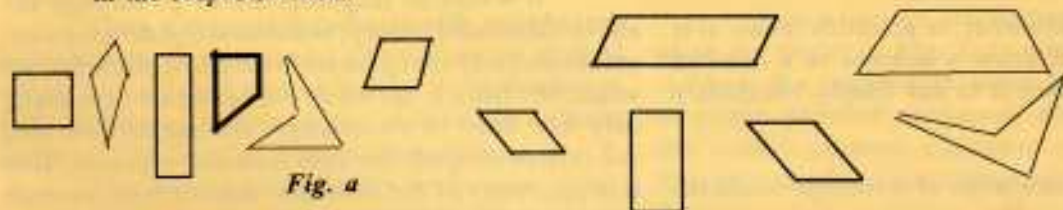


Fig. a

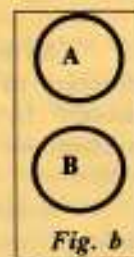


Fig. b

Every group would be now asked to define what constitutes the set A and finally share them, and produce a common definition.



## THE INVISIBLE THINGS THAT PUSH AND PULL US !!

We are being heavily pushed around all the time, by **AIR.....**

We definitely cannot see it, but we do see things being moved by the air, like, the leaves and branches of a tree, clothes flapping on a clothesline, dust, etc.

### **What is Air??**

Air is a mixture of gasses. We cannot see the gasses, but we know that they are there and weigh something.

Check it out with a foot ball full of air and another empty

Air takes up space.

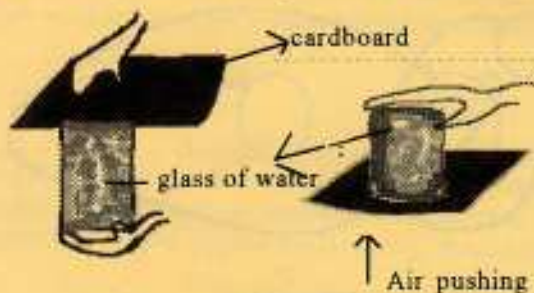
Check this out by turning a glass full of air upside down and pushing it down into a tub of water. What do you observe?

Air takes up space and pushes the water so it cannot fill the glass.

Tilt the glass over and let the air out. The glass will fill all the way up with water and finally sink!

When we are inside the house, then also the air is pushing on you as much from one direction as the other. Yet we do not feel it is pushing!!

Take a glass of water filled to its brim. Cover it with a card-board, turn the glass upside down quickly and take your hand away from the card-board.



### **What happened??**

The water does not flow off. This is because the air pushing up against the cardboard keeps the water in the glass.

The air moving fast around our Earth is the Wind. We again cannot see the air that is moving, but can see things being pushed by it.

When so much air is pushing around us we would be pushed off our Earth into the space!

But we are still on the earth without being blown off into the space!!!

### **How is this possible?**

From the center of our earth, there is a strong - strong **pull**, which we cannot see, called **Gravity**.

Yet, we can easily find out what it does. All you have to do is jump up into the air, and see what happens.....???



You left the earth when you jumped but came back down to the earth.

### **Gravity pulled you .**

Gravity pulls everything - stone, ball, paper, birds, insects, water, rain, -----**everything all the time from high to low.**

This **push and pull**, in Science, is referred to as **Force**.

Therefore, this pull of the gravity, is known as the **Force of Gravity!!!**

Observe how the see-saw works... Gravity pulls both the ends, but the two people balance to stay up for some time.

Besides the earth's pull, there are other things also that pull, like the Magnets. However, they pull only those things that are made of iron or steel. Observe this force. This force is called as **Magnetism**.

There are very minute bits of things which we again cannot see-smaller than the specks of gas, called electrons and protons. These also push and pull one another producing **Electricity**.

If you want to see this, run a comb through your hair about 20-25 times and put it close to a piece of paper, and see what happens?



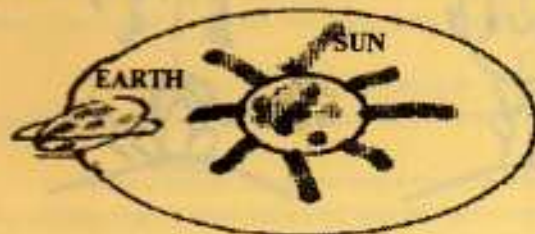
Did you see the paper jump to the comb? This is because the force of electricity is working. This force working between the paper and comb is a weak force. Electrons and protons move and work for us in fascinating ways....

Try looking, listening and thinking carefully around and it may help you to find some new things...

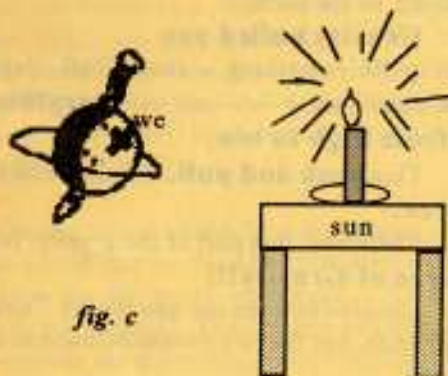


.....contd. from p. 5

Not only are we spinning about, but also moving around our unique and marvellous source of light and heat, the **Sun**. (The sun is a million times bigger than the earth). In other words, the ball of earth spins around the Sun too, like a top! (*fig. b*). This would mean that while the earth is turning round and round it is also moving around the sun.



*fig. b*



*fig. c*

Now, to find out how our earth moves to give us day and night.....For this let us pretend that a lighted candle placed on the table, in the center of a dark room, is the sun. Let us spin the orange, which we are pretending to be the earth, around the sun. (*fig. c*).

**What do you observe?**

Let us make a spot on the orange to presume that we live there. We will see that where we live is in the light part of the time and in the dark the rest of the time. When our part of the earth is turned away from the Sun, we experience darkness and get ready to be in bed for a sound sleep!

While we are sleeping, our earth is continuing to spin. Thus, when we wake up in the morning we see the sun shining bright and gay!

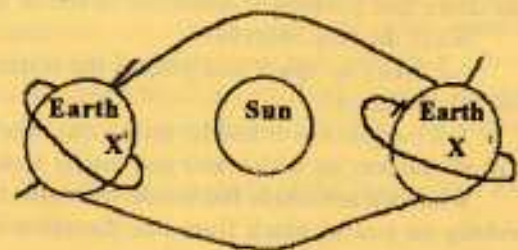
**So, where is the possibility of the Sun rising in the East and setting in the West?**

Now, it is hard, but interesting to think that 1 part of the year is cold and part hot in most parts of the world i.e., Winter and Summer.

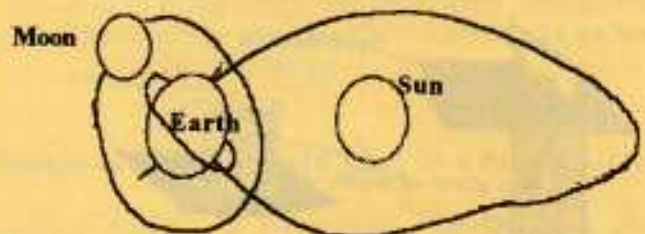
As mentioned earlier, we on the earth are not only spinning from day to night, it is also moving around the Sun, day and night.

For this, with the candle in the centre of your room, keep the orange in your hand, spinning it and also keep walking around the candle.

To move around the Sun, our Earth takes about 365 day and night spins, i.e., one complete year. On this year-long journey of the earth around the Sun, that half of the earth (northern half) where we live, is tipped part of the time toward the Sun. Therefore, we get more sunlight and our days are longer and hotter in Summer. When our half is tipped away from the Sun, our days are shorter and we have the cold of Winter. (*fig. d*).



*fig. d*



*(fig. e).*

There is no part of any day, when our Earth doesn't get light and heat from the Sun. If this happened, nothing could grow or stay alive on the Earth!!

There is another big ball, also moving, the Moon. This moves around our Earth. (*fig. e*). It takes about a month for the moon to complete its movement around our Earth. The moon gets its light from the Sun, on only one side at a time!

*What is a behaviour?*

Needs  
Physical  
Emotional  
Social

+

*Food for thought.....*

Self  
Knowledge  
Skills  
Experience  
Values  
Ideas  
Attitudes

+

Place  
Where  
With Whom

=

*Behaviour*



## REINFORCEMENT ACTIVITIES

+ X	3	7	2	9	1	5	4	6
1	3	7	2					
2	6	14						
3	9							
4								
5								
6								
7								
8								
9								

The main objective of this activity is to help students reinforce their mathematical operational skills, i.e., addition, subtraction, multiplication and division.

A grid as shown above, can be prepared for every child. The operation signs must be clearly specified on the left hand corner of the grid. The students are given the choice of their operations and instructed to circle that symbol. Accordingly they are told to fill up each blank space, the sum/product of the numbers on the top line, plus or times the number in the left-hand corner.

2. Another grid activity, as shown below could be given to practice addition, subtraction, multiplication and division skills. Here, they are given this grid, and asked to find out the basic math facts hidden in the grid and circle, inserting the relevant sign of the operation and "equal to" signs appropriately. The operations could appear horizontally, diagonally or vertically.

11	3	33	22	22	44	89	86
+ 6	4	30	6	15	-4	9	21
- 15	12	63	3	9	40	2	6
18	2	54	3	51	23	65	30
7	24	12	32	17	19	8	3
72	38	9	50	3	38	4	2
11	27	5	12	9	10	5	15
3	45	4	33	11	3	14	42



## **STATE OF THE ART TEACHING : THE ART OF LEARNING TO GROW**

The "ancient" Gurukul System, which one uses frequently as a frame of reference and comparison, today, apparently a misfit in the current trend exhibited towards commercialisation and industrialisation of education, is obsolete. This tradition that was not only relevant to the attitudes and life-style of that generation, was mainly a focus towards the Guru, who was not only a person with "technical skills" and a living and moving explosive of information and knowledge, but also was "well-managed", fulfilled and a person who was at peace with himself. In other words, he had the skills to "teach", the ability to pass on information, which was well-balanced with those difficult skills of self-control, tolerance, humility, and tranquility. The respect and reverence that was so much attached to the Gurus, and towards the profession was primarily an acknowledgment of this achievement in the person and not because of him being a store-house of information!!

This is by no means an intention to compare that style with the current practices. Teaching today is definitely not lacking in the awareness and availability of the latest information, aids, techniques and practices. Nor there seems to be a dearth of qualified teachers. What appears to be lacking is the balance between the dimensions of knowledge with the dimensions of self-growth.

The following excerpt of the interview between Radhika Srinivas (R), Editor of the Pathways, and Father T.V. Kunnunkal (K), on the question of self-actualisation - **the art of learning to grow** - is an attempt to throw some light towards this direction.

*R: There are many, and I presume millions who seek the goal of self-actualisation (the will and the ability to accept ones' abilities, and potentials and fulfill/actualise these so as to not only contribute in one's own growth but also influence those whom one comes in close contact with). Do most achieve this goal?*

*K: I do not know how many actually achieve it, but I am one who believes that self-actualisation (SA), is a goal that is present deep within the **human spirit** and I also believe that it is God Himself who has placed it there. Since God's actions are for fulfillment, it would be natural to presume that all who seek it the right way will move along the path to that goal.*

*R: You mentioned that the path must be the right one. That is the tough issue, I think. How does one choose the right path to self-actualisation? I pre-*

*sume that many are not growing, because of wrong paths. I know of several modern day psychologists who promote the idea of self-actualisation in various forms and capsules. How do you evaluate some of these theories?*

*K: Not an easy question to answer, Radhika, so I will answer it tentatively. In a very highly simplified fashion, I would say that the humanistic school of psychology broke away from the mechanistic school, namely from a mere **Reactive Response** or predictable and expected forms of response to a stimulus, to a more open-end, free, creative and explorative forms or what is called **Proactive Response**, or from narrow **Determinism** to **Freedom**, from the totally **External** to a **mix of the External with the Internal**. If one has to search, experiment and then determine the path to fulfillment, it would follow that there is no one true and authentic goal of pathway to self-actualisation, but the pathways are many. So there is a large choice before us.*

*R: That sounds very interesting and in a sense, assuring. Everyone need not follow the same beaten path, but can take the less travelled road and reach home still. Nevertheless, there must be some basic parameters of frames of reference, within which, I think, this freedom exists. Could you touch on some of these?*

*K: I would call attention to the three sets of poles that I referred to earlier, namely **the need to balance the interplay between Determinism and Freedom, between Reactive and Proactive response, between the External and the Internal**. There is an old song that has the catch words: "Don't fence me in" and goes to glory in the freedom to wander like the wild buffalo through the wide open country side. Refer to your earlier article in the Pathways on Discipline. It is a **subtle mix of the Order and Freedom**, of certain rules and norms and open or free spaces- **Both**, not one or the other! Carl Rogers began the personal freedom movement. Today, one would rarely find a pure Rogerian. Similarly, the mix between the External and Internal is crucial for SA. You can interpret this bi-polarity in more than one way.*

*R: I am sure that the teachers would like an illustration to clarify what you mean. Can you do that?*

*K: Take the concrete case of the syllabus. There are prescriptions, norms, rules to complete this or that part of the syllabus. Let us call that the Determined*



or Reactive part. There is also, in many school situations, the freedom given to the teachers who wish to try, to experiment, to reach goals through self-chosen methods and approaches. That would be the Free space or Proactive part. Something similar can be said about self-growth. There are social norms, cultural expectations and conventions. But surely we find many free persons, who, within those walls, find the courage (yes, it does take a bit of courage) to break out, to be oneself, to be different, based on one's personal principles and norms. I hope that makes it a little clearer.

R: What, in your opinion, are some of the blocks or hindrances to personal growth? I suspect that many are getting stagnated in life.

K: I also share that view, namely many stagnate in life. They are what I call conservatives. They love to preserve their Yesterdays or maintain the status quo, whether at home, while cooking, or at work or in school or in a social gathering, etc. **They dare not take risks, reasonable risks.** The others were what we call Progressives, namely those who look for a new tomorrow, for alternatives, for other ways of doing things. These are Proactive persons. **They are free within.** So, like that beautiful Jonathan Livingston Seagull, **they dare to fly into the open sky, take the less travelled roads.** The major blocks are, in my opinion: **lack of clarity and conviction about one's own goal in life and lack of courage or the fear that weighs like a millstone around their necks.**

R: Where is the hitch? Why is the goal exploration so difficult or rare? Why is fear such a large factor in so many lives? In other words, why can't many more take these pathways? I asked about that earlier, I am asking it again.

K: There is a lot to explore in that issue, so it is worth more than one question. Let me put it this way. Some of us are good learners, life-long learners. **Learning, to me, involves a process of going through life experiences (all of us have these), reflecting on these (which few do), and then taking Action based on the experiences and reflection (again only fewer do this).** When I am willing to look at myself objectively, by myself or with the help of a friend, I begin to learn many things about myself, namely what I am and what I am not. The result is that I learn. As I said, unfortunately very few are good learners.

Another point: I also find that most of what life has to teach us is easy enough to learn, and not difficult. **But the condition is that we look long**

**enough and deep enough into life's experiences, (events, persons, situations, everyday equipments, etc.) and then take beginning steps to turn reflection into action.** Many think that the external environment is what stops their growth, namely, this supervisor, or Principal, or that institutions' rules and system or the general climate (society). Undoubtedly, these do affect us. **But what is of much greater significance is the internal climate, your inner environment.** So, many lead miserable, routine, drab lives. Who is to blame? I think, essentially, themselves and partially also external factors. No one can grow for you. No one can love for you. No one can move beyond your Area of Comfort (your traditional boundaries, within which you operate). **You have to dare to move into life some newer Areas of Discomfort. This is the invitation of Life. This is the Challenge of Life!!**

R: You talk of challenges. Do people generally like to face challenges?

K: Possibly and by way of generalisation, (though it has many exceptions), not the lower third of the population, especially those who have not educated themselves through life experiences, who live by the labour of their hands and have little time for anything but survival needs. But knowledge workers, and professionals like teachers can surely be presented challenges and many, I think, will respond to them. **They will move into new areas of discomfort and by exploration and effort, make things happen and in the process also grow.** I call them Automotive persons. **Their moving power is from within.** The others are what I would call Pushcarts namely, those who move only when they are moved by others. You will remember Radhika, that we had this project on Pre-primary Education in EPG. Several practising teachers of the pre-primary and primary were excited and eager to participate, since they felt impelled to move out of a traditional comfort circle into a new and difficult circle. **The motive: the contribution that they would make through such a movement.**

R: You make it sound rather easy. Is that right?

K: I don't think it takes a genius or very special gifts to grow continually. Normal endowments will suffice. **But the awareness level has to be high,** the questioning, namely self-questioning must continue and readiness to take steps, namely Action. Let me also mention a caution. The young today expect easy miracles. One has passed from the law or medical or engineering college and expect instant fame. Or a teacher, after B.Ed. expecting miracles to happen in her class. **There is a rhythm**



*in, life. There is a patience in nature and a time frame. Not nervous tension. You hardly come across a nervous tree, because the fruit is taking time to mature. But you come across a lot of nervous people because the pace is not what they would have liked. So, eagerness - Yes. Wanting to get things done - Yes. But, without anxiety.*

**R:** Before we conclude this interview, do you have a final word to say?

**K:** What occurs to me is that we (most of whom are religious-minded persons) accept that there is a Design, A planner and that we are a part of a Cosmic Plan, that there is an Omega Point towards which this Universe and all of us, parts of

that reality, are moving, purposefully. The more I can make that universal purpose also my personal purpose and meaning structure, the more I have actualised an instrument for continuous self-growth, through learning.

The current race towards modernisation, hi-technology, and globalisation is turning people from all professions into the search for intense materialism, and commercialisation, sadly, this being true even among a few teachers! Amidst this exploration and rapid movement towards creating an imbalance, even if a willing and motivated diaspora (a group of individuals) attempt to move towards a conscious integrity and balance, we could raise our optimism atleast about the empowerment of education.

### **Find the next number in each sequence and colour the number in the square.**

42, 43, 44, \_\_\_\_  
40, 39, 38, \_\_\_\_  
59, 69, 79, \_\_\_\_  
3, 6, 9, \_\_\_\_  
79, 77, 75, \_\_\_\_

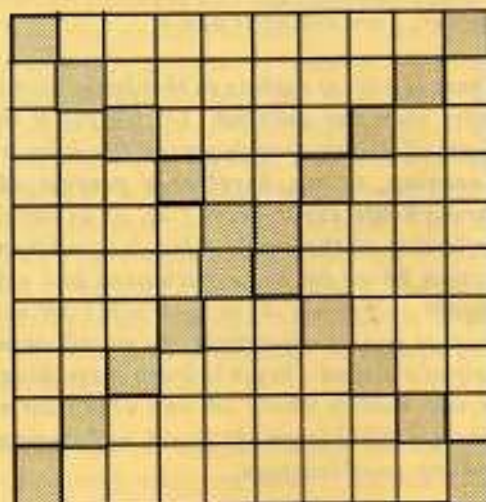
83, 74, 65, \_\_\_\_  
85, 90, 95, \_\_\_\_  
94, 84, 74, \_\_\_\_  
7, 14, 21, \_\_\_\_  
79, 80, 81, \_\_\_\_

11, 15, 19, \_\_\_\_  
52, 50, 48, \_\_\_\_  
16, 11, 6, \_\_\_\_  
22, 33, 44, \_\_\_\_  
100, 97, 94, \_\_\_\_

37, 47, 57, \_\_\_\_  
4, 6, 8, \_\_\_\_  
60, 66, 72, \_\_\_\_  
13, 15, 17, \_\_\_\_  
7, 16, 25, \_\_\_\_

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Your answer.





## HANDS-ON LEARNING ACTIVITIES

### IF YOUR CHILD.....

.....has problems copying from the board.

.....does poorly on written spelling work.

.....spells a word the way it sounds, for e.g. rayn for rain, or no for know, meen for mean, etc.

.....often skip words or even whole lines in reading.

.....use a finger as a guide whenever possible.

.....may not seem to observe things other students comment on, for e.g. teacher's dress, new display board, etc.

.....may have poor hand writing.

.....may do poorly on matching activities, especially where a series of lines must be drawn from one column to the other.

.....may not remember what he/she has read and performs better on matter discussed in the class.

.....may exhibit reversals in writing.

.....may leave out whole words or parts of words.

.....may have problems copying from the board.

.....may perform poorly on map activities.

.....may read much below the expected level of his/her general abilities, for his age-group.

.....may confuse words that look similar, like, bell, bill, bull, ball, and so on.

.....may rub his/her eyes or complains that his/her eyes hurt.....

.....very often answers with a simple yes or no, hardly using complex sentences;

.....may perform poorly in phonic-based activities;

.....may appear to ignore verbal directions;

.....may seem to misunderstand very often;

.....may not remember information given verbally.

.....may often look to see what everyone else is doing before following instructions;

.....may frequently ask questions to be repeated, in different words;

.....may exhibit an inability to explain in words many complex tasks he/she is able to do;

.....may exhibit poor speech, like low vocabulary, poor articulation, etc.;

.....may exhibit a "blank" expression on his/her face, or may appear to daydream during classes, which are mostly lecture-mode;

.....may often speak loudly, though he/she may dislike speaking before the group or listening to others;

.....may substitute gestures for words, or may seem, to grope for a word;

THEN

HE/SHE

COULD BE

A

**VISUAL LEARNER**

THEN

HE/SHE

COULD BE

AN

**AUDITORY LEARNER**



## **HANDS-ON SUPER-SIMPLE SCIENCE ACTIVITIES**

For helping children to understand about their bodies and how they grow, some of the following experiences could be provided:

1. Challenging children to list everything that can be done with his/her hands, like, slap, clap, rub, draw, scratch, poke, and so on...; with his feet, like run, skip, hop, dance, and so on....
2. The teacher makes a family tree with them, showing her immediate family, as grand-parents, aunts, uncles, and cousins, how tall, short, or medium their height is, what colour eyes, hair, most of them have; This could be followed by asking them to make an inventory of family traits and asking them to sort out traits that they think could be hereditary. Once they have sorted and listed out these, they could be encouraged to look in books to find out which of them could be hereditary and which may not be. For e.g. many problems, like those related to weight may not be hereditary but may be simply the results of poor and inadequate eating habits passed down from one generation to the other.!
3. A card game could be devised and played. For this, they could be asked to draw lines on the paper plates, dividing each plate into 4 equal parts, each one representing the four main food groups - cereals, meat and egg, fruits and vegetables and milk and milk products. They have to collect pictures of relevant food, for all the food groups and paste them on 3" X 5" cards. These are then shuffled and stacked, placing the cards face down. For playing, players would take turns drawing and discarding cards. If the card can be used, it would be put on the players' plate. The winner is the first person to have all four food groups on his/her plate.
4. The child could be made to stand up sideways against a wall, making sure that one foot and one shoulder and one ear are touching the wall. The child is challenged now to lift his/her outside leg to the side without moving away from the wall and without bending his/her knee. They could be invited to observe what happens and discover how impossible it is, for, we change our center of gravity and thus, cannot move without losing our balance. The children would enjoy doing this experiment!

---

Peter Russel, in his book "The Global brain", explores the experience of sharing energy, by considering a parallel phenomenon in the world of physics, the functioning of a laser, through which he explains the effect that a small number of 'enlightened people' - i.e., people actively working on inner development through consciousness - raising techniques, could have on the rest of the society.

*Light from any source consists of numerous different tiny pockets of waves (quanta) each coming from a different atom. In ordinary light, these waves are generally all out of step; they are said to be 'out of phase'. If, however, during the brief instant 'that an atom is about to emit its minute wave packet, light of a specific frequency (colour) impinges on it, the atom can be stimulated to emit a light pulse that is in phase with the wave that stimulated it. The new emission thus augments, or amplifies, the passing wave. At low power the net effect is still one of bundles of waves, out of phase with each other. As the power is increased, a certain level, called the laser threshold, is reached, at which a completely new phenomenon occurs, all the little bundles suddenly lock into phase; they are said to be coherent. When they do so, there is a tremendous raising in the intensity of the light produced....thus a small number of units acting coherently can easily outshine a much greater number incoherently. Sharing energy, thus, means encompassing someone else in our world and breaking down the barrier of ego separation. The more often we do this, the more aware we become that we all belong to the whole, we are all one energy.*

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